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ABSTRACT

Project MASTER completed its 3-year funding cycle in 1987-88. The project aimed at providing enhanced science instruction to 575 Spanish-speaking limited-English-proficient students in 5 elementary schools. Project MASTER offered classes in English as a Second Language (ESL), mathematics, science, and computer skills with a hands-on, integrated instructional approach. The project also developed curriculum materials stressing skills, attitudes, and knowledge about science topics within the context of bilingual education, provided activities to integrate program and mainstream students, offered staff development workshops and conferences in science and bilingual education, and made efforts to involve parents in project activities. The program achieved its proposed objectives in ESL and staff development. It was not possible to assess whether Project MASTER achieved its objectives in science, mathematics, or parent involvement due to lack of data. Program strengths include the interdisciplinary and hands-on approach to science education, emphasis on early intervention for young students, and coordination of the activities of project and school personnel. Recommendations for improvement include provision of an educational assistant and facilities such as a resource room at each school site. (MSE)

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EVALUATION SECTION
John Schoener, Chief Administrator
June 1989

EVALUATION SECTION REPORT

PROJECT MASTER

1987-88

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5/22/89

PROJECT MASTER*
1987-88

SUMMARY

- Project MASTER was fully implemented. During the 1987-88 school year, the project provided instruction in English as a Second Language (E.S.L.), mathematics, science, and computer skills. In addition, the project included curriculum and staff development, and parental involvement activities.

- The project achieved its E.S.L. and staff development objectives. Lack of data prevented objectives in mathematics, science, and parental involvement from being assessed as proposed.

Project MASTER was an Elementary and Secondary Education Act (E.S.E.A.) Title VII-funded project that completed its third year of a three-year funding cycle in 1987-88. The project aimed at providing enhanced instruction in science to 575 Spanish-speaking limited English proficient (LEP) students in five elementary schools in the Bronx.

The project offered classes in E.S.L., mathematics, science, and computer skills. All instruction involved a hands-on integrated approach. Project MASTER also developed curriculum materials stressing skills, attitudes, and knowledge about science topics within the context of bilingual education, provided activities to integrate program students with mainstream students, offered staff development workshops and conferences in science and bilingual education, and made efforts to involve parents in the project's activities.

Project MASTER achieved its proposed objectives in E.S.L.: students made significant gains from pretest to posttest on the Language Assessment Battery (LAB). The project met its staff development objective: two educational assistants enrolled in college level courses. Although a relatively high percentage of students passed three or more science tests, it was not possible to assess the objective for science as proposed due to a lack of pretest and posttest data. Similarly, it was not possible to assess the objectives for mathematics and parental involvement because of a lack of data. The Office of Research, Evaluation, and Assessment (OREA) used students' attendance data and test scores provided by the program, interviews of school and project staff, and classroom observations to evaluate the project.

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*This summary is based on the final evaluation of "Project MASTER 1987-88" prepared by the OREA Bilingual Education Evaluation Unit.

Project MASTER served 575 students at five sites in 1987-88 as compared with 608 students at six sites in 1986-87. In 1986-87 the project met its E.S.L., staff development, and content area objectives; in 1987-88 it met only with the first two objectives. This year, no data were provided to assess the mathematics and science objectives.

The strengths of the program included its interdisciplinary and hands-on approach towards science education, its emphasis on early intervention for young students, and the coordination of the activities of project and school personnel.

The conclusions, based on the findings of this evaluation, lead to the following recommendations:

- If funds permit, base an educational assistant at each site.
- If funds permit, provide facilities such as the resource room at each location.

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I. INTRODUCTION

This report documents the Office of Research, Evaluation, and Assessment's (OREA's) evaluation of the E.S.E.A. Title VII program, Project MASTER. During the spring semester of the 1987-88 school year, the project completed the third year of a three-year funding cycle. The project was intended to provide enhanced science experiences to limited English proficient (LEP) students in five elementary schools located in the South Bronx area of New York City.

PARTICIPATING STUDENTS

Project MASTER students were Hispanic. Most were born in the United States (241 students or 45 percent) and Puerto Rico (179 students or 34 percent), but a sizable number were from the Dominican Republic, and other Central and South American countries. Some students from Mexico were beginning to appear at these schools. The project served students in the third through sixth grades at P.S. 1, P.S. 25, I.S. 29, I.S. 47, and C.S. 77.

Project students scored below the twenty-first percentile on the English version of the Language Assessment Battery (LAB).*

DELIVERY OF SERVICES

The project was based in P.S. 29 which had a room equipped

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*Language Assessment Battery (LAB) was developed by the Board of Education of the City of New York to measure the English-language proficiency of nonnative speakers of English in order to determine if their level of English proficiency is sufficient to enable them to participate effectively in classes taught in English. Students scoring below the twenty-first percentile on the LAB are entitled to bilingual and E.S.L. services.

as a science resource center. It was used by students from nearby P.S. 1 who traveled there with their teachers once a week. The project staff visited the other three schools once a week. Instruction took place in the individual classrooms in the three sites that did not use the resource room.

STAFF

The staff consisted of a project director, a resource teacher, two educational assistants, and a part-time secretary. The field-based staff members were fluent in Spanish.

SETTING

The schools were all located in South Bronx neighborhoods with high levels of poverty, and were attended by pupils who come from the surrounding public housing projects or poorly maintained private housing. Many nearby lots were vacant and filled with rubble and garbage.

HISTORY OF THE PROGRAM

Previous evaluation reports of Project MASTER have presented the historical background of bilingual education at these schools and a history of the previous years of the program. See the final evaluation report of 1986-87 for a complete history.

REPORT FORMAT

This report is organized as follows: Chapter II describes the evaluation methodology; Chapter III analyzes the findings of the evaluation; and Chapter IV offers conclusions and recommendations.

II. EVALUATION METHODOLOGY

EVALUATION QUESTIONS

The evaluation assessed two major areas: program implementation and outcomes. Evaluation questions included the following:

Process/Implementation

- How did staff members conduct program activities over several sites?
- What did the staff development consist of?
- How were parents involved in the program?

Outcome

- What was the average Normal Curve Equivalent (N.C.E.) gain on the LAB?
- Were significant gains made on program-developed criterion-referenced tests in science and mathematics?

EVALUATION PROCEDURES

Sample

An OREA field consultant interviewed all five principals, the two resource specialists, the resource teacher, and classroom teachers. The consultant observed resource room and classroom instruction. OREA provided student data forms for all participating students. The project provided data on 575 students, although not in all areas.

Instrumentation

OREA developed an observation schedule to document the

classroom environment, instructional activities, and materials. It also developed and employed interview schedules for the project director as well as the other personnel whom it interviewed. Participating MASTER schools used the LAB to assess the acquisition of English language skills, and teacher-made tests to assess progress in learning science and mathematics.

Data Collection

OREA field consultants interviewed school and program staff and observed classes during the spring 1988. Project personnel completed data retrieval forms on an ongoing basis and returned them to OREA in June.

Data Analysis

OREA evaluated E.S.L. achievement by calculating LAB pretest/posttest N.C.E. differences.* In lieu of a comparison group, data analysts performed a t-test and calculated the difference between the means. OREA also calculated the effect size.** OREA computed the passing rates on science exams. The

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*Raw scores were converted to N.C.E. scores which are normalized standard scores. They have the advantage of forming an equal interval scale so that scores and gains can be averaged. For the norming population, N.C.E.s have a mean of 50, a standard deviation of approximately 20, and a range from one to 99. Scores can be compared to the norming population.

**The effect size, developed by Jacob Cohen, is a ratio of the mean gain to the standard deviation of the gain. This ratio provides an index of improvement in standard deviation units irrespective of the size of the sample. Effect size (E.S.) is interpreted to indicate educational meaningfulness, and an E.S. of .80 is thought to be highly meaningful, while one of .20 is considered to be only slightly so.

project did not provide any data in mathematics.

Limitations

Since all program-eligible students were involved either in the current project or another program, it was impossible to select a similar comparison group. The project did not provide data on all program participants. However, the numbers of students for whom there were data were large enough to make the analyses meaningful.

III. EVALUATION FINDINGS

INSTRUCTIONAL ACTIVITIES

Project MASTER proposed instructional objectives in E.S.L., mathematics, and science. Integrating and coordinating the individual subject areas with instruction in reading, writing, speaking, and listening was a high priority for the program.

Coordination of Content Area Subjects

Mathematics, science, computer skills, and English language acquisition all occur simultaneously. In one fifth-grade class observed by an OREA field consultant, students reviewed a variety of aspects of the solar system. After a short review, students broke up into groups to prepare end-of-semester reports on topics related to the solar system. Students had to choose which group they wanted to be in, but the numbers in each group had to be the same. The calculation of how many students could be in each group required division, which they carried out as a natural part of the process of grouping. In another class, students worked with batteries and light bulbs, buzzers, and switches. Students had to be alert to voltages and to polarity in order to make their circuits work. Usually, during these hands-on experiments, the resource teacher and educational assistants used English. One educational assistant often provided the primary instruction while the resource teacher and the other educational assistant moved from student to student or group to group.

In the classes observed, the activities moved back and forth

naturally between the subjects of mathematics and science and the explication of English terms, pronunciation, and construction. The students from P.S. 1 and P.S. 29 who had access to the resource room had a somewhat richer environment in which to learn than those students at the other three schools. Although their classrooms were filled with science and mathematics materials such as model solar systems hanging from the ceiling--they could not match the equipment and materials kept on hand at the resource room. Only in this respect did instruction systematically vary across the participating schools. Some teachers were more enthusiastic than others and thus better prepared their students for their weekly project-provided lesson. That variability did not detract from the positive effects of the project. In addition, most teachers were very pleased to be part of the project.

The Project MASTER had originally planned to provide instruction in computer technology. Because of limitations imposed by funding reductions, computer experiences offered to project students had to be provided through other auspices. The success of the participating principals in obtaining computer resources was evident in that every room visited by the field consultant had a computer. Some schools had, in addition, full computer laboratories in which a wide array of instructional offerings were provided. The project's resource room at P.S. 29 had a computer and a software library containing up-to-date and excellent science and mathematics programs.

Participating teachers and project staff members integrated instruction in thinking skills throughout the curriculum. As instruction in science and mathematics require the understanding of logic and method, the students naturally acquired analytical skills.

A unit used in a fourth grade class was illustrative of the year's activities. The project staff discussed what students liked to eat, had them keep a food diary, had students chart their food intake, prepared a well-balanced meal in class, reviewed the nutrients in foods (minerals, starches, vitamins, fats, sugars), and discussed food groups. Thus, the class combined reading, writing, speaking, and listening with active manipulation of materials centering on a critical science issue.

English As A Second Language

- As a result of participating in the program LEP children will make statistically significant gains in English language proficiency.

Project MASTER used the LAB for pretesting and posttesting. In order to assess achievement, OREA data analysts used a correlated t-test on pretest and posttest N.C.E. scores. Data were available for 190 students in grades three, four, and five. Students in all three grades showed a significant increase in their LAB scores. (See Table 1.) The overall effect size was .72 and suggested that the gains were of moderate educational meaningfulness. The project met its E.S.L. objective.

TABLE 1

Pretest/Posttest N.C.E. Differences on the Language Assessment Battery by Grade

Grade	Number of Students	Pretest Mean	Pretest S.D.	Posttest Mean	Posttest S.D.	Difference Mean	Difference S.D.	t Value	Effect Size
3	75	15.3	13.2	30.4	10.8	15.1	14.2	9.15*	1.06
4	77	20.8	9.2	25.8	11.1	5.0	10.3	4.23*	.49
5	38	16.6	11.2	21.8	16.5	5.2	7.9	4.00*	.69
TOTAL	190	17.7	11.6	26.8	12.5	9.1	12.7	9.85*	.72

*$p<.05$

- Students in all three grades showed statistically significant gains on the LAB.

Mathematics

- As a result of participating in the program LEP children will show significant gains in mathematics achievement.

Since the project did not provide any data OREA could not evaluate the accomplishment of the mathematics objective.

Science

- As a result of participating in the program for at least two years, the LEP children would have mastered a significant number of science concepts and skills on a program developed criterion referenced measurement instrument.

OREA could not evaluate this objective as written because pretest and posttest data were not available. However, the program did provide data relating to the number of science tests taken and the number passed, by grade. Participating students took five tests at each grade level. Sixty-five percent of 180 students in grade three, 74 percent of 205 students in grade four, and 79 percent of the 149 students in grade five, and 91 percent of the 35 students in grade six for whom data were available passed three or more tests. Although it was not possible to determine whether the objective, as stated, had been met, it was obvious from the data gathered that students increased their skills in science.

NONINSTRUCTIONAL ACTIVITIES

Project MASTER proposed noninstructional objectives in staff development and parental involvement.

Staff Development

- By the end of the final year of the project, it is expected that 100 percent of the educational assistants in the target schools will enroll in a program leading towards teacher certification as assessed by documentation of registration in a degree-granting program at a local university.

The project's two educational assistants were enrolled in undergraduate degree programs, thereby meeting the proposed objective.

The project director and the resource teacher gave workshops in conjunction with the City University of New York. They offered the workshops both for the educational assistants and for participating bilingual teachers.

Parental Involvement

- By the end of the final year of the project, it is expected that 50 percent of the parents of LEP students participating in the project will have attended parent conferences, seminars, or workshops as assessed by attendance records kept by the project.

Because of funding restrictions, the project could not offer parents at all sites the full range of workshops and services that had been proposed. According to the project director, there were weekly parent workshops at every school on bilingual education, mathematics and science, leadership training, and health and nutrition. The project did not provide attendance data. Seven parents participated in the project's advisory council, which met once in October 1987.

Curriculum Development

In line with the New York State Elementary Science Syllabus, the project developed materials stressing skills, attitudes, and knowledge about science topics, all within the context of bilingual instruction. The project-developed curriculum integrated mathematics and science in a hands-on context using E.S.L. instructional techniques.

Noninstructional Program Benefits

One goal suggested in the original proposal concerned fostering a positive self-image through cultural pride. The resource teacher and educational assistants were themselves Hispanic and fluent in Spanish. Students in all grades appeared very pleased and responsive each time the project staff came into a room or when they went to the project's resource room. The resource teacher and the educational assistants were models of educational and occupational achievement for the students.

Another goal of the project was to provide participating LEP students with opportunities to integrate with non-LEP students in various educational and recreational activities. An OREA field consultant saw this occur at a local science fair. Project students displayed a very lifelike model of the human body, cut away so that internal organs they had made were visible. Nonprogram students were impressed with the entry and asked the project students many questions about it. This interaction, built on the project students' achievements, was a good example of interaction across the LEP/non-LEP boundary.

IV. CONCLUSIONS AND RECOMMENDATIONS

Project MASTER, completing its third year of funding, was a very valuable resource for the LEP Spanish-speaking children in Community School Districts 7 and 12. Everyone with whom the field consultant spoke--principals, participating teachers, teachers with adjacent classrooms whose special education students were allowed in the resource room, and students--agreed that the project was extremely valuable. Principals said that they wanted a resource room in their own school and wanted the project's resource teacher and educational assistants on their own full-time staff.

The project met its proposed objective for student achievement in E.S.L. and its objective for staff development. However, inappropriate or missing data prevented OREA from assessing project objectives in science, mathematics, and parental involvement as proposed.

Both the OREA field consultant and project and school staff felt that the facilities provided by the resource room should be available in all participating schools, if at all possible. Having an educational assistant at each site would also be a decided advantage. These changes would allow for wider services at each participating school, especially as the new educational assistants became more adept--as the current ones were--at leading the hands-on model of instruction. Secondly, staff members frequently mentioned that traveling between schools limited the time spent with teachers and students.

The conclusions, based on the findings of this evaluation, lead to the following recommendations:

- If funds permit, base an educational assistant at each site.
- If funds permit, provide facilities such as the present resource room at each location.